

Claims

- [c1] An apparatus for making a prosthetic socket, comprising:
a vacuum source;
a vacuum bladder having a closed distal end and an open proximal end;
a tubing means for providing fluid communication between said vacuum source and said distal end of said vacuum bladder;
said vacuum bladder adapted to receive a residual limb;
a first plastic separator disposed in overlying relation to said residual limb;
a layer of unhardened plaster means disposed in overlying relation to said first plastic separator;
a wick means disposed in overlying relation to said layer of unhardened plaster means;
a hemostatic latch for sealing said proximal end of said vacuum bladder when said residual limb, first plastic separator, plaster means, and wick means are positioned within said vacuum bladder;
whereby a predetermined vacuum is applied internally to said vacuum bladder for a predetermined amount of time until said plaster means hardens into a negative cast;
whereby the residual limb is manipulated through said vacuum bladder before said plaster means hardens to modify the geometry of the plaster means as appropriate for the physiology of the residual limb; and
whereby the negative cast is removed from the residual limb and a positive cast is produced by pouring plaster into the negative cast.
- [c2] The apparatus of claim 1, further comprising:
a thermoplastic sheet thermoformed over the positive cast;
whereby a prosthetic socket is made in the absence of reduction and modification of a hard positive cast.
- [c3] The apparatus of claim 1, further comprising:
a carbon-epoxy matrix laminated over the positive cast;
whereby a prosthetic socket is made in the absence of reduction and modification of a hard positive cast.

- [c4] The apparatus of claim 1, further comprising a second plastic separator disposed in overlying relation to said unhardened layer of plaster means.
- [c5] The apparatus of claim 1, further comprising a vacuum regulator disposed between said vacuum source and said vacuum bladder.
- [c6] The apparatus of claim 5, further comprising a valve means disposed between said vacuum regulator and said vacuum bladder.
- [c7] The apparatus of claim 5, further comprising a manifold disposed between said vacuum regulator and said vacuum bladder.
- [c8] The apparatus of claim 7, further comprising a vacuum gauge in fluid communication with said manifold, said vacuum gauge adapted to provide a visual display of pressure within said manifold.
- [c9] An apparatus for making a prosthetic socket, comprising:
a vacuum source;
a vacuum bladder having a closed distal end and an open proximal end;
a tubing means for providing fluid communication between said vacuum source and said distal end of said vacuum bladder;
said vacuum bladder adapted to receive a residual limb;
a prosthetic liner disposed in overlying relation to said residual limb;
a layer of unhardened plaster means disposed in overlying relation to said prosthetic liner;
a wick means disposed in overlying relation to said layer of unhardened plaster means;
a hemostatic latch for sealing said proximal end of said vacuum bladder when said residual limb, prosthetic liner, plaster means, and wick means are positioned within said bladder;
whereby a predetermined vacuum is applied internally to said vacuum bladder for a predetermined amount of time until said plaster means hardens into a negative cast;
whereby the residual limb is manipulated through said vacuum bladder before said plaster means hardens to modify the geometry of the plaster means as

appropriate for the physiology of the residual limb; and
whereby the negative cast is removed from the residual limb and a positive cast
is produced by pouring plaster into the negative cast.

- [c10] The apparatus of claim 9, further comprising:
a thermoplastic sheet thermoformed over the positive cast;
whereby a prosthetic socket is made in the absence of reduction and
modification of a hard positive cast.
- [c11] The apparatus of claim 9, further comprising:
a carbon-epoxy matrix laminated over the positive cast;
whereby a prosthetic socket is made in the absence of reduction and
modification of a hard positive cast.
- [c12] The apparatus of claim 9, further comprising a first plastic separator disposed
in overlying relation to said prosthetic liner.
- [c13] The apparatus of claim 12, further comprising a second plastic separator
disposed in overlying relation to said unhardened layer of plaster means.
- [c14] The apparatus of claim 9, further comprising a vacuum regulator disposed
between said vacuum source and said vacuum bladder.
- [c15] The apparatus of claim 14, further comprising a valve means disposed between
said vacuum regulator and said vacuum bladder.
- [c16] The apparatus of claim 14, further comprising a manifold disposed between
said vacuum regulator and said vacuum bladder.
- [c17] The apparatus of claim 16, further comprising a vacuum gauge in fluid
communication with said manifold, said vacuum gauge adapted to provide a
visual display of pressure within said manifold.
- [c18] A method for making a prosthetic socket, comprising the steps of:
applying a first plastic separator in overlying relation to a residual limb;
wrapping plaster bandage means that have been soaked in water around said
first plastic separator;

applying a vacuum wick means in overlying relation to said plaster bandage means;
providing a vacuum bladder and inserting said residual limb, said first plastic separator, said plaster bandage means, and said vacuum wick means into the vacuum bladder;
providing a hemostatic latch and sealing said hemostatic latch over a proximal end of said vacuum bladder;
applying a predetermined vacuum internally to said bladder for a predetermined amount of time until said plaster bandage means hardens into a negative cast;
manipulating the residual limb through said vacuum bladder before said plaster bandage means hardens to modify the geometry of the plaster bandage means as appropriate for the physiology of the residual limb;
removing the negative cast from the residual limb; and
producing a positive cast by pouring plaster into the negative cast.

- [c19] The method of claim 18, further comprising the step of:
thermoforming a thermoplastic sheet over the positive cast;
whereby reduction and modification of a hard positive cast is eliminated.
- [c20] The method of claim 18, further comprising the step of:
laminating a carbon-epoxy matrix over the positive cast;
whereby reduction and modification of a hard positive cast is eliminated.
- [c21] The method of claim 18, further comprising the step of applying a second plastic separator in overlying relation to said plaster bandage means prior to the step of positioning said vacuum wick means over said plaster bandage means.
- [c22] A method for making a prosthetic socket, comprising the steps of:
inserting a residual limb within a prosthetic liner;
wrapping plaster bandage means that have been soaked in water around said prosthetic liner;
applying a vacuum wick means in overlying relation to said plaster bandage means;
providing a vacuum bladder and inserting said residual limb, said prosthetic liner, said plaster bandage means, and said vacuum wick means into the

vacuum bladder;
providing a hemostatic latch and sealing said hemostatic latch over a proximal end of said vacuum bladder;
applying a predetermined vacuum internally to said bladder for a predetermined amount of time until said plaster bandage means hardens into a negative cast;
manipulating the residual limb through said vacuum bladder before said plaster bandage means hardens to modify the geometry of the plaster bandage means as appropriate for the physiology of the residual limb;
removing the negative cast from the residual limb; and
producing a positive cast by pouring plaster into the negative cast.

- [c23] The method of claim 22, further comprising the steps of:
thermoforming a thermoplastic sheet over the positive cast;
whereby reduction and modification of a hard positive cast is eliminated.
- [c24] The method of claim 22, further comprising the steps of:
laminating a carbon–epoxy matrix over the positive cast;
whereby reduction and modification of a hard positive cast is eliminated.
- [c25] The method of claim 22, further comprising the step of applying a first plastic separator in overlying relation to said prosthetic liner prior to the step of applying said plaster bandage means in overlying relation to said prosthetic liner.
- [c26] The method of claim 25, further comprising the step of applying a second plastic separator in overlying relation to said plaster bandage means prior to the step of positioning said vacuum wick means over said plaster bandage means.